

WHAT IS CLAIMED IS:

1. An optical wireless hub device comprising:

an optical module including a plurality of optical receivers, each optical receiver configured to receive a unique optical wireless signal, the optical module being configured to distinguish each unique optical wireless signal at one of the optical receivers;

processor circuitry coupled to the plurality of optical receivers, the processor circuitry receiving electrical signals derived from the optical wireless signals; and
an interface unit coupled to the processor circuitry.

2. The device of claim 1 wherein different ones of the optical receivers are aligned to have different fields of view such that each incoming optical beam can be viewed by at most one receiver.

3. The device of claim 1 wherein different ones of the optical receivers are aligned with adjacent receivers have different fields of view such that each incoming optical beam cannot be viewed at the same time by two adjacent receivers.

4. The device of claim 1 wherein different ones of the optical receivers are aligned so that no receivers within a certain area have coincident fields of view such that each incoming optical beam cannot be viewed by any two receivers in said area at the same time.

5. The device of claim 1 wherein each optical receiver includes a filter so that the receiver receives optical signals within a limited range of wavelengths.

6. The device of claim 5 wherein each optical receiver located so that it can receive no more than one of the unique optical wireless signals.

7. The device of claim 1 wherein some of the optical receivers include a filter that only passes a first polarization of light and others of the optical receivers include a filter that only passes a second polarization of light, the first polarization being substantially orthogonal to the second polarization.

8. The device of claim 1 wherein different ones of the optical receivers are enabled and disabled over time such that each optical receiver can receive no more than one of the unique optical wireless signals.

9. The device of claim 1 wherein one of the optical receivers is configured to receive at least first and second unique optical wireless signals, the first and second unique optical wireless signals being time division multiplexed.

10. The device of claim 1 wherein each of the unique optical wireless signals includes a modulated sub-carrier signal and wherein each of the optical receivers is configured to receive source information from the modulated sub-carrier signal.

11. The device of claim 1 wherein the optical module is configured to distinguish each unique optical wireless signal at only a respective one of the optical receivers using at least two techniques, the at least two techniques selected from field of view, wavelength filter, polarization filter, time division multiplexing and subcarrier modulation.

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12. The device of claim 1 wherein the processor circuitry comprises a digital signal processor.

13. The device of claim 1 wherein the process circuitry comprises a microcontroller.

10 14. The device of claim 1 wherein the interface unit comprises a physical layer device.

15. An optical wireless communication device comprising:
a first optical wireless receiver having a photodetector with a first field of view;
a second optical wireless receiver having a photodetector with a second field of view, the
second field of view being at least five degrees out of line with the first field of view; and

5 processing circuitry coupled to the first and to the second optical wireless receivers, the
processing circuitry receiving first data from a first remote source and second data from a second
remote source, the first data being received through the first optical wireless receiver and the second
data being received through the second optical receiver.

10 16. The device of claim 15 wherein the first optical wireless receiver further includes a
polarization filter.

17. The device of claim 15 wherein the first optical wireless receiver further includes a
wavelength filter.

15 18. The device of claim 15 wherein the optical wireless communication device further
comprises a transmitter, the transmitter comprising:

a source of light having a beam of light;

a controllable beam steering device; and

20 an actuator to permit steering said light beam, the beam steering device being controllable
by predetermined control signals.

19. The device of claim 15 wherein the optical wireless communication device further comprises a plurality of additional optical receivers, at least some of the additional optical receivers having a photodetector with said first field of view.

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20. A method of communicating with a optical wireless signal, the method comprising:
receiving a first optical wireless signal from a first source;
receiving a second optical wireless signal from a second source; and
distinguishing between the first optical wireless signal and the second optical wireless
5 signal.

21. The method of claim 20 wherein the distinguishing step is accomplished by receiving the
first optical wireless signal at a first angle and receiving the second optical wireless signal at a
second angle that is different than the first angle.

22. The method of claim 21 wherein the first angle is at least five degrees different than the
second angle.

23. The method of claim 20 wherein the first optical wireless signal centered around a first
wavelength and the second optical wireless signal is centered around a second wavelength.

24. The method of claim 20 wherein the first optical wireless signal has a first polarization and
the second optical wireless signal has a second polarization, the second polarization being
substantially orthogonal to the first polarization.